**Product Description**

- The Type 285 is a non-contacting welded metal bellows seal for cryogenic applications.
- Thanks to its design and materials of construction, the Type 285 can safely seal the most common industrial liquid gases. It fits the most popular cryogenic pumps: site-based and road tanker pumps.

**Performance Capabilities**

- Temperature: -196°C/-320°F to Ambient
- Pressure: up to 7 bar g/100 psig
- Speed: up to 10,000 rpm
- End play/axial float allowance: 0.13mm/0.005" F.I.M. max.
- Shaft runout: 0.001mm per mm/0.001" per inch of shaft diameter F.I.M. max.

**Design Features/Benefits**

- No face wear under normal operating conditions
- Specially designed stationary bellows
- Floating stator
- Compact design
- Meets liquid oxygen (LOX) safety standards
- Anti-spark sleeve and retaining ring
- Reduced power consumption
- Minimal product loss
- Available as cartridge seal

**Applications**

Industrial liquid gases, including:

- Oxygen
- Nitrogen
- Argon
**Type 285 Typical Arrangement**

Materials of Construction

<table>
<thead>
<tr>
<th>SEAL COMPONENTS</th>
<th>STANDARD MATERIALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotor/Mating Ring</td>
<td>Tungsten Carbide</td>
</tr>
<tr>
<td>Stator/Primary Ring</td>
<td>Carbon</td>
</tr>
<tr>
<td>Spring-Energized Seal</td>
<td>Virgin PTFE, Cobalt Chrome Alloy Spring</td>
</tr>
<tr>
<td>Anti-Spark Sleeve</td>
<td>Tin Bronze</td>
</tr>
<tr>
<td>Metal Bellows</td>
<td>Alloy 718 (Alloy 625 End Fittings)</td>
</tr>
<tr>
<td>Retaining Ring</td>
<td>Nickel-Copper Alloy</td>
</tr>
<tr>
<td>Shims</td>
<td>Copper Alloy</td>
</tr>
<tr>
<td>Other Metal Parts</td>
<td>316L Stainless Steel</td>
</tr>
</tbody>
</table>

**Sealol Welded Metal Bellows**

**Sealol design features**
- Optimum 45° tilt angle
- Three-sweep radius
- Nesting ripple plate design
- Light spring loads

**Sealol bellows benefits**
- Uniform plate rigidity and stress distribution
- Enhanced fatigue strength
- Self-cleaning through flexing/slicing action
- Pressure-balanced by design
### John Crane Non-contacting Technology

**John Crane Design Features**
- Uni-directional pattern
- Non-contacting operation
- Superior film stiffness

**John Crane Spiral Groove Technology Benefits**
- Eliminates face wear under normal operating conditions
- Increases mean time between planned maintenance (MTBPM)
- Minimizes product loss
- Reduces power consumption
- Eliminates Lubrication Support Systems Required with Labyrinth Seals

### Characteristics of Cryogenic Fluids

#### Boiling Points

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Temperature °C</th>
<th>Temperature °F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen</td>
<td>-183</td>
<td>-297</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>-196</td>
<td>-320</td>
</tr>
<tr>
<td>Argon</td>
<td>-186</td>
<td>-303</td>
</tr>
</tbody>
</table>

#### Vapor Pressure Curve for Nitrogen

![Vapor Pressure Curve for Nitrogen](image.png)

- **Typical duty point:** 6 bar/87 psig at -196°C/-320°F

- **LIQUID PHASE**
- **GAS PHASE**
If the products featured will be used in a potentially dangerous and/or hazardous process, your John Crane representative should be consulted prior to their selection and use. In the interest of continuous development, John Crane Companies reserve the right to alter designs and specifications without prior notice. It is dangerous to smoke while handling products made from PTFE. Old and new PTFE products must not be incinerated. ISO 9001 and ISO14001 Certified, details available on request.

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North America
United States of America
Tel: 1-847-967-2400
Fax: 1-847-967-3915

Europe
United Kingdom
Tel: 44-1753-224000
Fax: 44-1753-224224

Latin America
Brazil
Tel: 55-11-3371-2500
Fax: 55-11-3371-2599

Middle East & Africa
United Arab Emirates
Tel: 971-481-27800
Fax: 971-488-62830

Asia Pacific
Singapore
Tel: 65-6518-1800
Fax: 65-6518-1803

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